

## **Title: Scrumptious Snack Facts**

### **Brief Overview:**

Students will be involved in comparing the nutritional values of their favorite snacks. The process will include finding fractional parts, changing fractions to decimals, and converting decimals to percents. The students will determine the most nutritional snack in a classroom survey and write a letter to commend the company that manufactured it.

### **Links to NCTM 2000 Standards:**

- **Standard 1: Number and Operation**

Mathematics instructional programs should foster the development of number and operation sense so that all students understand numbers, ways of representing numbers, relationships among numbers, and number systems; understand the meaning of operations and how they relate to each other; and use computational tools and strategies fluently.

- **Standard 2: Patterns, Functions, and Algebra**

Mathematics instructional programs should include attention to patterns, functions, symbols, and models so that all students use symbolic forms to represent and analyze mathematical situations and structures; and use mathematical models and analyze change in both real and abstract contexts.

- **Standard 3: Geometry and Spatial Sense**

Mathematics instructional programs should include attention to geometry and spatial sense so that all students use visualization and spatial reasoning to solve problems both within and outside of mathematics.

- **Standard 4: Measurement**

Mathematics instructional programs should include attention to measurements so that all students apply a variety of techniques, tools, and formulas for determining measurements.

- **Standard 5: Data Analysis, Statistics, and Probability**

Mathematics instructional programs should include attention to data analysis, statistics, and probability so that all students pose questions and collect, organize, and represent data to answer those questions; and interpret data using methods of exploratory data analysis.

- **Standard 6: Problem Solving**

Mathematics instructional programs should focus on solving problems as part of understanding mathematics so that all students build new mathematical knowledge through their work with problems; develop a disposition to formulate, represent, abstract, and generalize in situations within and outside mathematics; and monitor and reflect on their mathematical thinking in solving problems.

- **Standard 7: Reasoning and Proof**

Mathematics instructional programs should focus on learning to reason and construct proofs as part of understanding mathematics so that all students recognize reasoning and proof as essential and powerful parts of mathematics; make and investigate mathematical conjectures; develop and evaluate mathematical arguments and proofs; and select and use various types of reasoning and methods of proof as appropriate.

- **Standard 8: Communication**

Mathematics instructional programs should use communication to foster an understanding of mathematics so that all students organize and consolidate their mathematical thinking to communicate with others; express mathematical ideas coherently and clearly to peers, teachers, and others; extend their mathematical knowledge by considering the thinking and strategies of others; use the language of mathematics as a precise means of mathematical expression; and develop and evaluate inferences and arguments that are based on data.

- **Standard 9: Connections**

Mathematics instructional programs should emphasize connections to foster an understanding of mathematics so that all students recognize and use connections among different mathematical ideas; understand how mathematical ideas build on one another to produce a coherent whole; and recognize, use, and learn about mathematics in contexts outside of mathematics.

- **Standard 10: Representation**

Mathematics instructional programs should emphasize mathematical representations to foster an understanding of mathematics so that all students create and use representations to organize, record, and communicate mathematical ideas; and use representations to model and interpret mathematical phenomena.

**Grade/Level:**

Grade 5

**Duration/Length:**

Four 45-60 minute class periods

**Prerequisite Knowledge:**

Students should have a working knowledge of the following skills:

- Fractions as part of a whole
- Constructing fractions
- Comparing fractions

- Changing a fraction to a decimal
- Rounding decimals to the nearest hundredth
- Changing a decimal to a percent
- Constructing and interpreting a bar graph
- Constructing and interpreting a pie graph
- Reading and interpreting a chart
- Writing a business letter

### **Student Outcomes:**

Students will:

- determine fractional parts by gathering information from a chart.
- change fractions to decimals using calculators.
- expressing a percent from a rounded decimal number.
- read and collect data on a chart.
- analyze data represented in a pie graph.
- construct a bar graph.
- construct a pie graph.
- explain the use of fractions and percents in the construction of a pie graph.

### **Materials/Resources/Printed Materials:**

- Unifix cubes
- Plastic plates – two different colors, one of each color per student
- Scissors (1 pair per student)
- Geoboards-one per student pair (11x11) and rubber bands
- Crayons and markers
- Student Resource Sheet #1: “Fraction Fitness” (one per student) and overhead copy of same
- Student Resource Sheet #2: “Scrumptious Snack Food Favorites” (10x10 Grid)
- Centimeter graph paper
- Overhead copy of any snack “Nutritional Facts” label
- Overhead projector, overhead pens
- Calculators (overhead calculator if available)
- Student Resource Sheet # 3: “Is It Nutritional?” and “Snack Fitness”
- Tape
- Poster paper
- Rulers
- 18x24” sheets of white paper (one per team of four)
- Overhead writing prompt: Teacher Resource Sheet #1
- Teacher Resource Sheet #2: “Writing Prompt Vignette Rubric”

## **Development/Procedures:**

### **Task 1**

- Ask the students to name their favorite packaged snack foods. Make a list of five or six favorite snacks on the board. Next, have the students vote for their favorite snack out of the five or six listed. Tell students they can only vote once. Once the students have voted, have them total the number of votes. Tell the students to determine the relative frequency of each favored snack. The frequency should be expressed as a fraction. The numerator represents the number of votes received by that snack, while the denominator is the total number of votes cast. Write the fractional part down next to each snack. (Save the results off to the side for a Task 2 activity.)
- Have the students work in teams of two or four. Divide the Unifix cubes among the different teams so that each team has five or six different colors. Use a different color to represent each snack. Write the colors next to the fractional parts of each. Tell the teams to construct a model of the whole representation of snack choices. When the teams finish their models have them present their findings to the class.
- Hand out two different colored plates and one pair of scissors to each student. Have them make one straight cut on each plate from the edge to the center. Then demonstrate how to interlock the two plates together, creating a sliding fractional pie graph. Have the students make their own. Then use the fractional pie graphs for an informal assessment time to see if the students have a good concept of the size of each fractional part. Ask them to make each fractional part and then hold it up to show you.

### **Task 2**

- Hand out Student Resource Sheet #1, “Fraction Fitness” and calculators. Using your overhead of “Fraction Fitness” model how to change fractions to decimals and decimals to percents. Have the students work together in pairs. When students are finished, have them show and explain their results on the overhead copy.
- Hand out geoboards (11x11), rubberbands, and Student Resource Sheet #2: “Scrumptious Snack Food Favorites.” Have students use the original results from the survey, calculate the percents, and then show their results on the geoboards. Once they have constructed their representations, have them duplicate their construction onto the resource sheet. Have the students tape their sheets to the wall. Explain to the students that the same percentage can be represented in different configurations. \* Homework assignment: Tomorrow, bring in one packaged snack food or simply the “Nutritional Facts” label from the package.

### **Task 3**

- Hand out Student Resource Sheet #3, “Is It Nutritional?” Model an example using an overhead copy of the sheet. Show the step-by-step procedure of gathering the data (in grams) and determining the fractions, changing fractions to decimals and decimals to percents. Then model how to represent the data in a bar graph. Use centimeter graph paper to draw your bar graph. Color the bars using different colors to represent each nutritional value. (Representative colors need to be uniform for the whole class.) Cut out the bars from the bar graph and tape them together, end-to-end, in a circle. Lay the circle down on poster paper, and tape it to the poster paper. Mark off each colored section and draw a line to the center. Color in the sections of the pie. Have students make a key for their bar graph. Tell the students to follow the step-by-step procedure just shown to them using their own snack label. Have students staple their snack wrapper to the poster. When students finish, have them present their pie graphs and post on the wall.

### **Task 4**

- Use the overhead copy of the “Nutritional Facts” label to lead a discussion on the relationship of each category to its nutritional value.
- Separate students into teams of four. Have the individuals in each team choose between the following jobs: the recorder who records the team’s conclusions, the presenter who presents the conclusions, the time keeper who keeps track of the time, and the initiator who leads the discussion. Hand out 18”x24” sheets of white paper and markers. Instruct the teams to compare and analyze the pie graphs that are on the wall, determine the healthiest snacks and write their ideas and conclusions on the team sheet. Have the teams share their results and determine, as a whole class, the top three healthiest snacks.
- Display Teacher Resource Sheet #1, writing prompt vignette, on the overhead projector. Have the students work independently editing and revising their letters until they produce their final draft. Use the rubric, Teacher Resource Sheet #2, to assess their writing.

### **Performance Assessment:**

The assessments for this learning unit include a model of fractional parts of a whole (Unifix cubes), fractional display using colored plates, construction of pie graphs, analysis and explanation of fractions and percents in a writing vignette. The vignette is assessed by a rubric.

### **Extension/Follow Up:**

- Have the students analyze the nutritional value of other food products they eat daily. Have the students research the amount of fat and sodium the typical fifth grader should consume. Have them keep a chart of daily fat and sodium intake and determine the fractional parts of the daily-recommended allowance that they consume.

- Have students survey family members or friends as to their favorite snacks. Compare results to original survey. Get percentages of those who eat healthy snacks and those who do not.

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### **Fraction Fitness**

The class across the hall voted on their favorite snack food. Of the 25 students in Mr. Smith's class, six preferred cookies, four chose chips, two loved cupcakes, three thought popcorn was the best, nine voted for candy and one liked crackers best for a snack.

On the chart below, write each fractional part for each snack. In order for us to compare our class to Mr. Smith's class we will need to change the fractions first to a decimal and then to a percent.

Remember to change a fraction to a decimal; divide the numerator by the denominator. Round to the nearest hundredth to determine the percent.

<b>Snack</b>	<b>Relative Frequency (Fraction )</b>	<b>Decimal</b>	<b>Percent</b>
Cookies			
Chips			
Cupcakes			
Popcorn			
Candy			
Crackers			

Name \_\_\_\_\_

## Scrumptious Snack Food Favorites

There are 100 squares. Percent is based upon 100, therefore use one square for each percent. (Example: 34% - color in 34 squares.)

- Color in the percentage of each snack chosen as the favorites.
- Complete the key below by coloring in the boxes and labeling the snacks.


### Snack Key



Name: \_\_\_\_\_

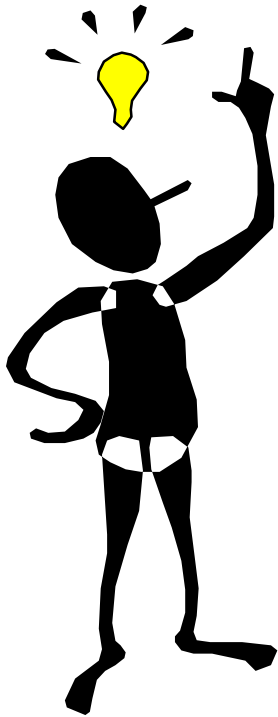
## Is It Nutritional?

Use the Nutritional Facts label from your favorite snack to determine the fraction, decimal and the percent for the following five nutritional values: total fat, cholesterol, sodium, total carbohydrates, and protein.

Total grams in a single serving: \_\_\_\_\_

	Fraction	Decimal	Percent
Total Fat			
Cholesterol			
Sodium			
Total Carbohydrates			
Protein			





**Write a business letter to the company that manufactures the snack that you have decided is the healthiest. Explain how you used fractions and percents to determine the healthiest snack. Compare the findings of three other snacks to your choice. Commend the company for producing the snack you chose. Edit and revise your letter to produce a final draft.**

## **Business Letter Rubric**

- 4 – The student explains how fractions and percents helped in making his/her final decision.  
Comparison is made to the fractional differences of three other snacks.  
Letter is well written; showing evidence of editing and revisions.  
Commendation to company that manufactured snack is based on mathematical findings.**
- 3 – Use of fractions or percents is presented but not explained.  
Comparison is made to the fractional differences of two other snacks.  
Letter shows evidence of editing and revision.  
Commendation to company that manufactured snack is made but not connected to mathematical findings.**
- 2 – Use of fractions or percents is merely referred to.  
Comparison is made to the fractional differences of one other snack.  
Letter has little evidence of editing or revisions.  
Commendation to company that manufactured snack is weak, and no mathematical connections are made.**
- 1 – Use of fractions or percents is not mentioned.  
No comparisons are made to other snacks.  
Letter has not been edited or revised.  
There is no commendation to the company that manufactured the snack.**